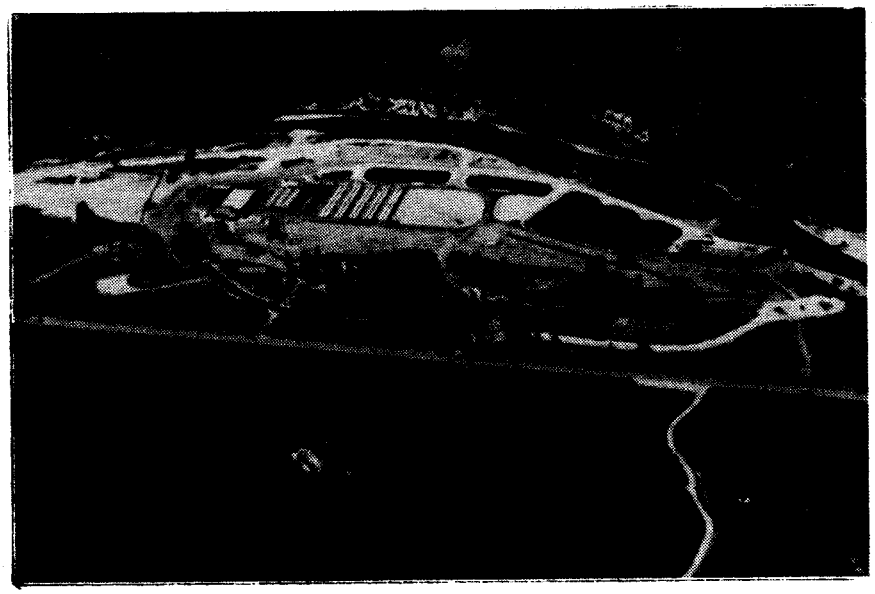
SAWTOOTH FISH HATCHERY AND EAST FORK SATELLITE

1988 Spring Chinook Salmon
1989 Steelhead Trout



by

Richard D. Alsager, Fish Hatchery Superintendent III

March 1993

TABLE OF CONTENTS

Page

1988 SPRING CHINOOK SALMON BROOD YEAR REPORT 1

Hatchery Description 1
1988 Spring Chinook Salmon Returns 1
Adult Spring Chinook Salmon Coded-Wire-Tag Recoveries 2
Prespawning Mortality 2
Chinook Salmon Spawning 5
Carcass Disposition 5
Chinook Salmon Eggs 5
Chinook Salmon Fry 5
Chinook Salmon Fingerlings 6
Chinook Salmon Smolts 6
Production Costs 8

1989 STEELHEAD TROUT BROOD YEAR REPORT 8

Steelhead Trout Adult Returns 8
Adult Steelhead Trout Coded-Wire-Tag Recovery 9
Steelhead Trout Spawning 12
Disease Sampling 12
Fish Disposition 12
Steelhead Trout Eggs 12
Stocking 14

APPENDICES 15

LIST OF TABLES

Table 1. Survival from green eggs to release 7

Table 2. Production costs 8

Table 3. Steelhead trout smolt release to bring back 1989 adults 9

Table 4. Summary of Steelhead trout trapped, spawned, and released and kelt disposition at Sawtooth and East Fork facilities, 1989 . 13

LIST OF FIGURES

Page

Figure 1. Sawtooth spring chinook salmon run, 1988 3

Figure 2. East Fork spring chinook salmon run, 1988 4

Figure 3. Daily run totals for Sawtooth steelhead, 1989 . 10

Figure 4. Daily run total for East Fork steelhead, 1989 . 11

LIST OF APPENDICES

Appendix A. Sawtooth Hatchery smolt releases and adult returns, 1988 16

Appendix B. East Fork chinook salmon smolt releases and adult returns, 1988 17

Appendix C. Length frequency distribution of Sawtooth chinook salmon, 1988 18

Appendix D. Length frequency of Sawtooth chinook, 1988 19

Appendix E. Length frequency distribution of East Fork chinook salmon, 1988 20

Appendix F. Lenth frequency of East Fork chinook, 1988 21

Appendix G. Length frequency distribution of Sawtooth steelhead trout, 1989 22

Appendix H. Length frequency of Sawtooth steelhead, 1989 23

Appendix I. Length frequency distribution of East Fork steelhead trout, 1989 24

Appendix J. Length frequency of East Fork steelhead, 1989 25

Appendix K. Sawtooth Hatchery marked chinook smolt released, brood year 1988 26

CONTENTS

SAWTOOTH FISH HATCHERY AND EAST FORK SATELLITE

1988 SPRING CHINOOK SALMON BROOD YEAR REPORT

Hatchery Description

Sawtooth Fish Hatchery is part of the Lower Snake River Compensation Plan and has been in operation since 1985. Mitigation goals for this facility is to return 19,000 adult spring chinook salmon Oncorhynchus tshawytscha above Lower Granite Dam and has the capacity to rear 2,400,000 spring chinook salmon smolts. this hatchery also has the capacity to eye-up 4,500,000 steelhead trout Oncorhynchus mykiss eggs, which are shipped to Hagerman National and Magic Valley hatcheries for rearing. A satellite station located on the East Fork of the Salmon River includes trapping, holding, and spawning facilities for adult salmon and steelhead trout.

Sawtooth Hatchery receives its water from the Salmon River and three production wells. The wells provide 7.8 cubic feet per second (cfs) of water and maintains a minimum temperature of 40°F in winter and up to 50°F during the latter part of the summer. The river provides up to 55 cfs of water, with temperature variations from 32°F to 68°F. Rearing water from the river enters an intake structure located one-half mile upstream from the hatchery building and runs through a 54-inch pipe to a control box, located in the hatchery building, where final screening is accomplished. Water is then distributed to the indoor vats, outside raceways, or adult fish facility. Incubation water is provided by two production wells. Back-up to the incubators is gravity flow river water through a check valve from the control box. Inside vats may utilize either well or river water, or both, with excess well water spilled back into the control box for use in the outside raceways.

Production facilities include: 100 stacks of PAL incubators containing 800 trays; 16 indoor rearing vats, each with 400 cubic feet of rearing space; 12 outside fry raceways, each with 750 cubic feet of rearing space; and 28 final rearing raceways, each with 2,700 cubic feet of rearing space. The lower sections of the final rearing raceways have serial re-use water from the top sections. The adult fish facility consists of a weir, fish trap, three adult holding ponds, each with 4,500 cubic feet of holding area, and a spawning area located at the upper end of the holding ponds.

1988 Spring Chinook Salmon Returns

Returning adults to Sawtooth Hatchery in 1988 resulted from natural escapement, smolt releases in 1985 and 1986, and jacks returning from the 1987 release. The Sawtooth fish weir and trap were put into operation on May 23, 1988

and were operated through September 6, 1988. The fish trap was checked daily, and fish were transferred to the adult holding ponds or released upstream. A total of 1,485 spring chinook salmon were trapped (Figure 1), which included 632 males and 853 females. Chinook salmon age class totals included 80 jacks, 87 four-year-olds, and 1,318 five-year-olds. Age breakdown was done by length using the criteria of 64 cm or less classified as jacks, greater than 64 cm up to and including 82 cm were classified as four-year-olds, and greater than 82 cm were counted as five-year-olds. There were 385 males and 548 females held for spawning, while the remaining 247 males and 305 females were released upstream of the weir to spawn naturally. Ponded fish were injected with erythromycin phosphate at a rate of 5 mg for each pound of fish weight to help control Bacterial Kidney Disease (BKD).

The East Fork chinook salmon adults returned from natural escapement as well as from smolts released in 1987 and 1986.

Trapping of chinook salmon at the East Fork facility began on June 1, 1988 and continued through September 1, 1988. The trap was checked daily, and the fish were transferred to the holding ponds or released above the velocity barrier to spawn naturally. A total of 548 salmon were trapped (Figure 2), which included 278 males and 270 females. Age breakdown included 6 jacks, 23 four-year-olds, and 519 five-year-olds. Age criteria was done using length frequency data the same as Sawtooth Hatchery criteria. There were 175 males and 171 females held for spawning and released 103 males and 99 females above the East Fork weir velocity barrier to spawn naturally.

Adult Spring Chinook Salmon Coded-Wire-Tag Recoveries

All adult spring chinook salmon were examined from fin clips and tags. The recovery information on tags was not received at the time of this report. However, we did collect two left ventral-clipped fish (jacks) released in the fall of 1986.

Prespawning Mortality

Prespawning mortality included all females which died before spawning and all males which died prior to the end of the second week of spawning. Sawtooth ponded 933 adult spring chinook salmon, and 39 were lost to prespawning mortality (4.2%). This included 24 females, 12 males, and 3 jacks. The East Fork ponded 346 adult spring chinook salmon, and 49 were lost to prespawning mortality (14.2%). This included 31 females and 18 males.

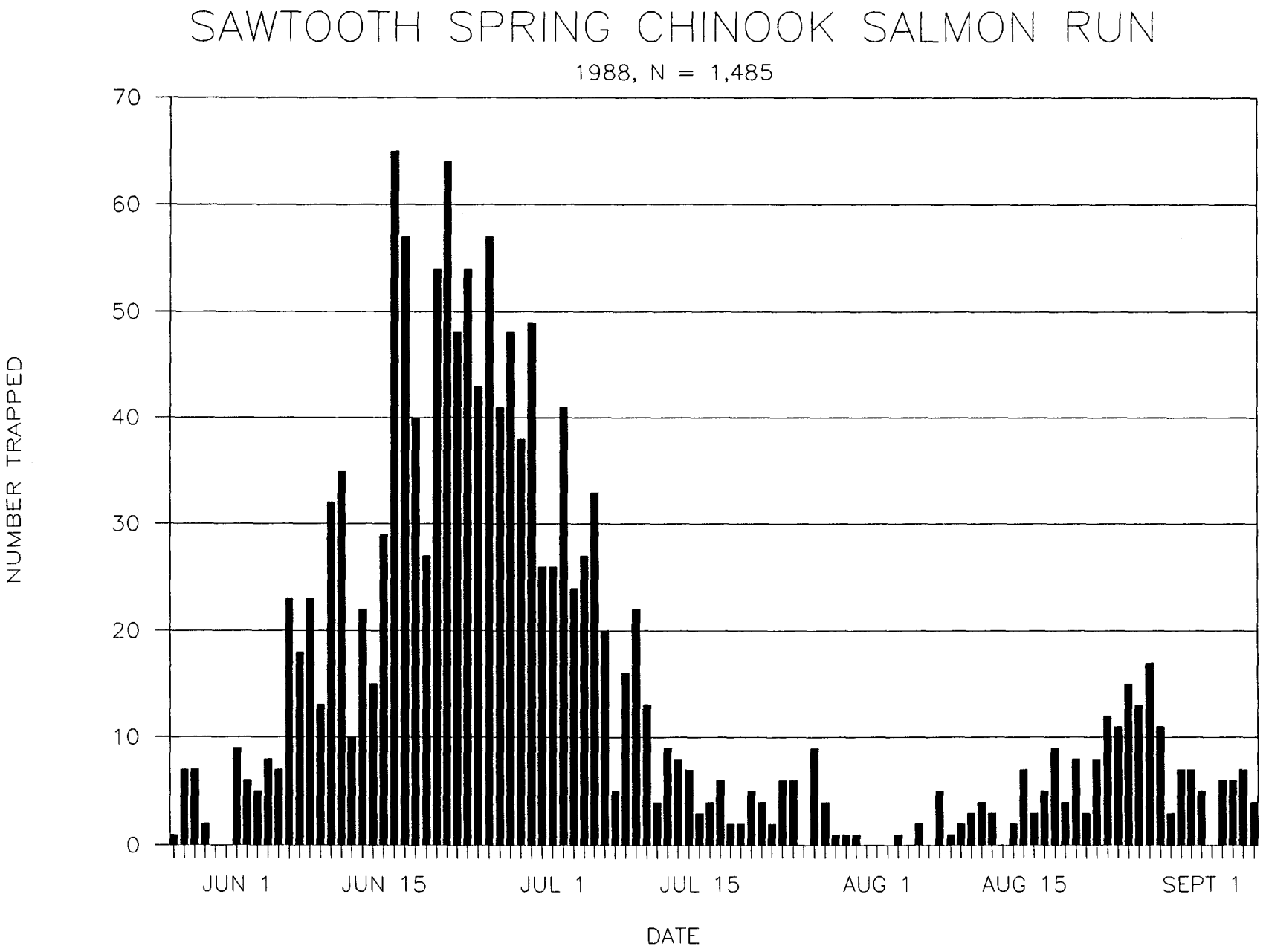


Figure 1. Sawtooth spring chinook salmon run, 1988.

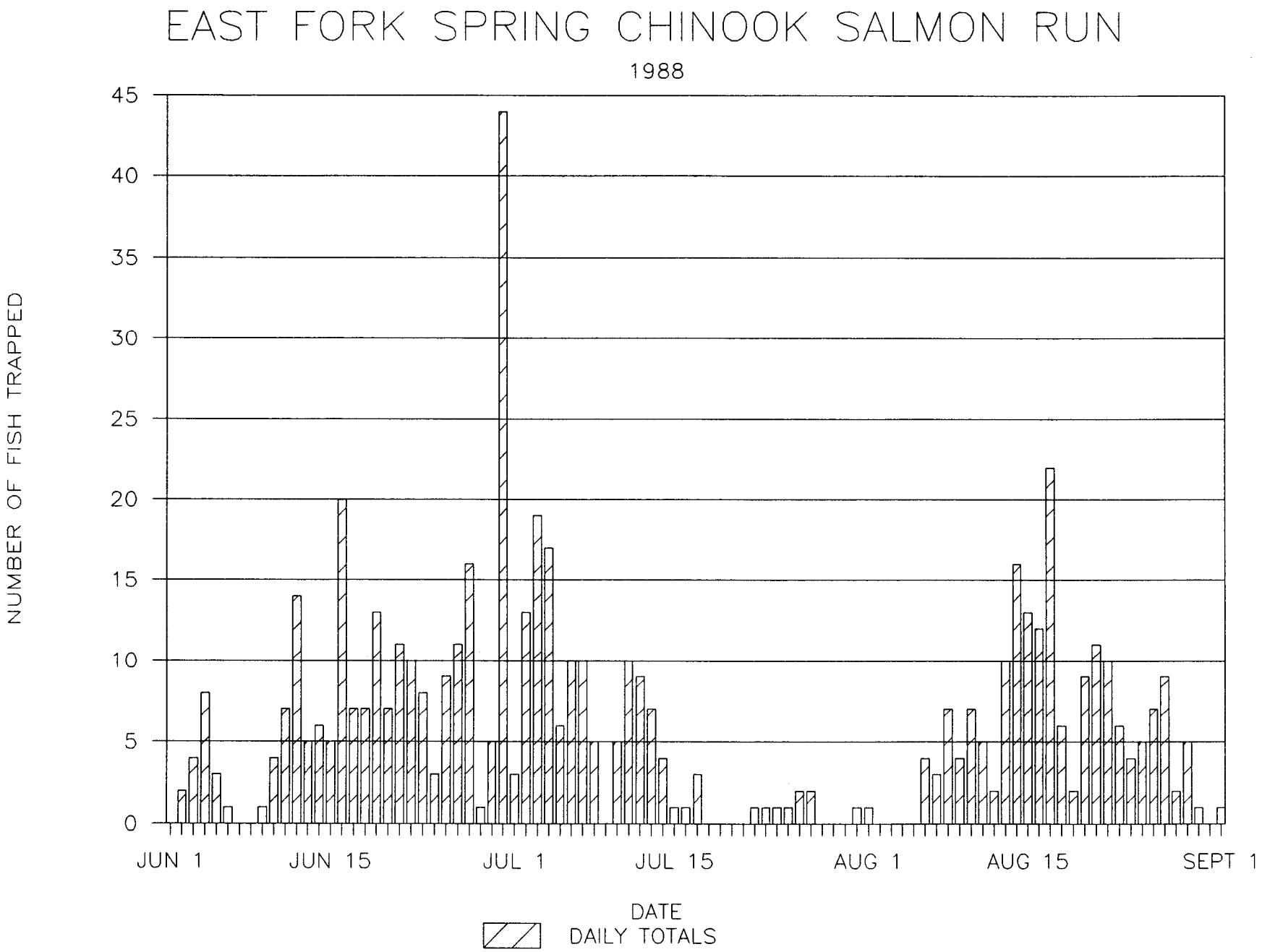


Figure 2. East Fork spring chinook salmon run, 1988.

Chinook Salmon Spawning

Spawning operations began at Sawtooth Hatchery on August 2, 1988 and continued twice a week through September 2, 1988. A total of 513 females were spawned for a total egg take of 3,120,668 green eggs, or a fecundity of 6,083 eggs per female.

East Fork spawning began on August 4, 1988 and continued twice a week through September 1, 1988. A total of 131 females were spawned for a total of 790,512 green eggs, or a fecundity of 6,034 eggs per female.

Chinook salmon eggs were taken by making an incision on the female and placing the eggs in a colander to drain off the ovarian fluid. Eggs from two females were then placed into a spawning bucket and fertilized by the sperm of two males. The eggs were rinsed in well water and water-hardened in a minimum of 100 ppm Argentyne solution for one hour.

Carcass Disposition

Sawtooth and East Fork salmon carcasses were checked for Coded Wire Tags (CWT), then placed in freezer boxes and stored in the freezer trailer until the end of the salmon season. Tagged fish snouts were removed and sent to the marking lab for tag number verification. They were then hauled to the sanitary landfill and buried.

Chinook Salmon Eggs

After fertilization and water-hardening, eggs were placed into incubators at 85 ounces per tray with the water flow set at 5 gpm. Incubation temperatures ranged between 40°F and 50°F. To prevent fungus growth, eggs were treated with formalin five days a week at a concentration of 1,667 ppm. This treatment was discontinued after the eggs were eyed and picked.

An eye-up of 91.2% was obtained for Sawtooth and 92.1% for East Fork eggs. Eyed eggs were measured back into the incubators at 85 ounces per tray and began to hatch at 900 temperature units (TUs).

Chinook Salmon Fry

The swim-up fry were moved to the indoor rearing vats at approximately 1,675 TUs, or when the fry began to swim-up. Fry were placed into the vats at 200,000 fish per vat in 200 cubic feet of rearing space. Initial feeding was begun with OMP IV starter mash and *OMP* IV 1/32-inch for one week. Then the fry were fed entirely 1/32-inch until they reached 400 fish per pound. The fry were given the entire 400 cubic feet of rearing space after three to four weeks. After trying baffles in 1987 with a two-vat experiment, baffles were used in every vat in 1988. They were inserted every four feet, with a total of 11

baffles in each vat. This enabled the hatchery crew to reduce the daily cleaning time, reduce stress on the small fry, keep their feed suspended longer in the water column for better conversion, and create a more sanitary condition for fish culture.

When they reached 400 fish per pound, the 1/32-inch OMP IV was mixed with 3/64-inch until the fry reached 200 fish per pound.

All OMP IV feed through 3/64-inch was enhanced with ten times the normal pantothenic acid to help prevent "spring thing" mortality.

In late May 1989, there were 71,500 fry planted in both Pole Creek and Smiley Creek for a total of 143,000 at 178 fish per pound. The fish were planted for an Idaho Department of Fish and Game (IDFG) research project conducted by Russ Kiefer. We also stocked 126,100 Sawtooth fry in May at the same weight in the upper Salmon River and 125,000 fry in the Yankee Fork.

Chinook Salmon Fingerlings

The 1988 brood year chinook salmon were moved from the early rearing vats to the outside raceways starting the first week in April 1989, with the last of the fish moved out the end of May. The fingerlings averaged 250 fish per pound, and 200,000 were placed in 1,700 cubic feet of rearing space at 1.5 cfs of water flow per raceway. When they reached a density index of .3, they were given 5,400 cubic feet of rearing space, and water flows were increased to 2.5 cfs per raceway. Fingerlings were switched to OMP IV 1/16-inch at 200 fish per pound, then to 3.32-inch at 100 fish per pound. OMP IV 1/8-inch pellets were fed as the fish reached 50 fish per pound until they were released. In late June 1989, there were 51,000 fingerlings stocked in Alturas Lake Creek and 88,000 fingerlings in the East Fork. This was done to reduce densities in three raceways for a density experiment being conducted at Sawtooth Hatchery. These fish were 76 fish per pound when stocked in June.

Chinook Salmon Smolts

A fall release of 395,400 smolts was made at Sawtooth on October 12, 1989 which included 91,800 CWT fish. These fish averaged 34.9 fish per pound, or 11,329 pounds of fish. This is an *ongoing* experimental release to determine optimum release timing.

In March 1990, chinook salmon smolts were evaluated for condition and disease by the Idaho Department of Fish and Game (IDFG) pathologist. The smolts were found to be in generally good condition, with the exception of four Raceway B sections with CWT and freeze-branded (FB) fish, which were found to be infected with BKD. BKD incidence was found mainly in raceways 1 through 8, which were the same chronic raceways that held 1987 brood year chinook salmon.

8889BYRP

Whirling Disease was also found in the pre-release smolts, but at a low incidence and causing no fish mortality.

The following results were found using the Goede and Houghton (1985) autopsy-based fish health/condition assessment system:

Sawtooth Stock
Summary of Normals

Eyes	95%
Gills	90%
Pseudobranchs	50%
Thymus	100%
Mesentery Fat	75% *
Spleen	90%
Kidney	90%
Liver	35%
Bile	100% **
Hind Gut	90%

Remarks: East Fork stock were generally the same readings.
* Greater than 50% coverage.
** Full bladder.

On March 17 and 20, 1990, the screens and boards were pulled on the Sawtooth stock for spring-released fish, with a total 1,500,200 smolts released into the Salmon River. These smolts averaged 23 fish per pound, or 63,340 pounds of fish. An additional 200,800 Sawtooth smolts were planted in the Yankee Fork on March 20, 1990. They averaged 21 fish per pound, or 9,700 pounds of fish. The East Fork smolts, which totaled 514,600, were planted in the East Fork of the Salmon River on March 21, 1990. They averaged 22.3 fish per pound, or 23,100 pounds of fish. Of those chinook salmon released in the spring, 10,002 were PIT-tagged, 57,300 were FB, and 342,750 were CWT.

Total survival from green eggs to release was Sawtooth stock 81.4% and East Fork stock 76.2% (Table 1).

Table 1. Survival from green eggs to release.

Green eggs	Eyed eggs	%	Swim-up	%	Released	%
Sawtooth 3,120,669	2,846,235	93.1	2,818,312	90.3	2,541,500	81.4
East Fork 790,512	727,667	92.1	720,574	91.2	602,600	76.2

8889BYRP

Production Costs

The cost of producing chinook salmon eggs, fry, and smolts is summarized in Table 2. An overall conversion of 1.71 was attained on both Sawtooth and East Fork spring chinook salmon during the rearing period.

Table 2. Production costs[1].

Lbs of fish produced	Lbs of feed fed	Feed cost	Conversion	Cost per lb produced
112,490	192,316	$94,235	1.71	$.84
Personnel Costs	$349,076			
Operating Costs	405,535			
Capital Outlay	5,745			
Program Total	$760,356			

[1]Costs estimated for entire 18-month rearing cycle.

1989 STEELHEAD TROUT BROOD YEAR REPORT

Steelhead Trout Adult Returns

The 1989 Sawtooth steelhead trout adult returns were from 699,715 smolts released in 1986 and 687,634 released in 1987. These fish were reared and stocked by Hagerman National and Magic Valley hatcheries (Table 3). Some of the returns were also from 1,433,700 "A" fry planted in the upper Salmon drainage and natural-spawning fish.

The 1989 East Fork steelhead trout adult returns were from 174,375 smolts released in 1985, 621,149 released in 1986, and 485,078 released in 1987. These fish were reared and stocked from Hagerman National and Magic Valley hatcheries. Some of the returns were from 339,500 "B" fry plants in the East Fork drainage and natural-spawning fish.

The Sawtooth fish trap was put into operation on March 13, 1989 and operated through May 3, 1989. A total of 994 adult steelhead trout were trapped during this period (Figure 3), which included 536 males and 458 females.

8889BYRP

The East Fork trap was put into operation on March 20, 1989 and operated through May 3, 1989. A total of 379 adult steelhead trout were trapped during this period (Figure 4). Two hundred fifty males and 129 females comprised the East Fork run.

Table 3. Steelhead trout smolt release to bring back 1989 adults.

Date released	Hatchery rearing	Number	Marks	Stock
Sawtooth				
1986	HNFH	9,450	102801LV	A
1986	HNFH	39,125	102844LV	A
1986	HNFH	52,300	LD-T-2	A
1986	HNFH	598,840	NONE	A
1987	HNFH	673,359	NONE	A
1987	HNFH	14,275	102948LV	A
TOTAL		1,387,349		
East Fork				
1985	HNFH	39,375	102631LV	B
1985	HNFH	35,225	102636LV	B
1985	HNFH	17,425	102555LV	B
1985	HNFH	16,950	102803LV	B
1985	HNFH	8,100	102802LV	B
1985	HNFH	25,525	102854LV	B
1985	HNFH	31,775	RD-Y-3	B
1986	HNFH	95,833	NONE	
1986	HNFH	25,325	102820LV	B
1986	HNFH	51,325	LD-T-4	B
1986	HNFH	448,666	NONE	B
1987	HNFH	460,309	NONE	B
1987	HNFH	24.769	102949LV	B
TOTAL		1,280,602		

Adult Steelhead Trout Coded-Wire-Tag Recovery

Adult steelhead trout at Sawtooth Hatchery and East Fork were examined for clips, marks, or tags before release or being spawned. Thirty-six CWT fish returned to Sawtooth and 12 CWT fish returned to the East Fork.

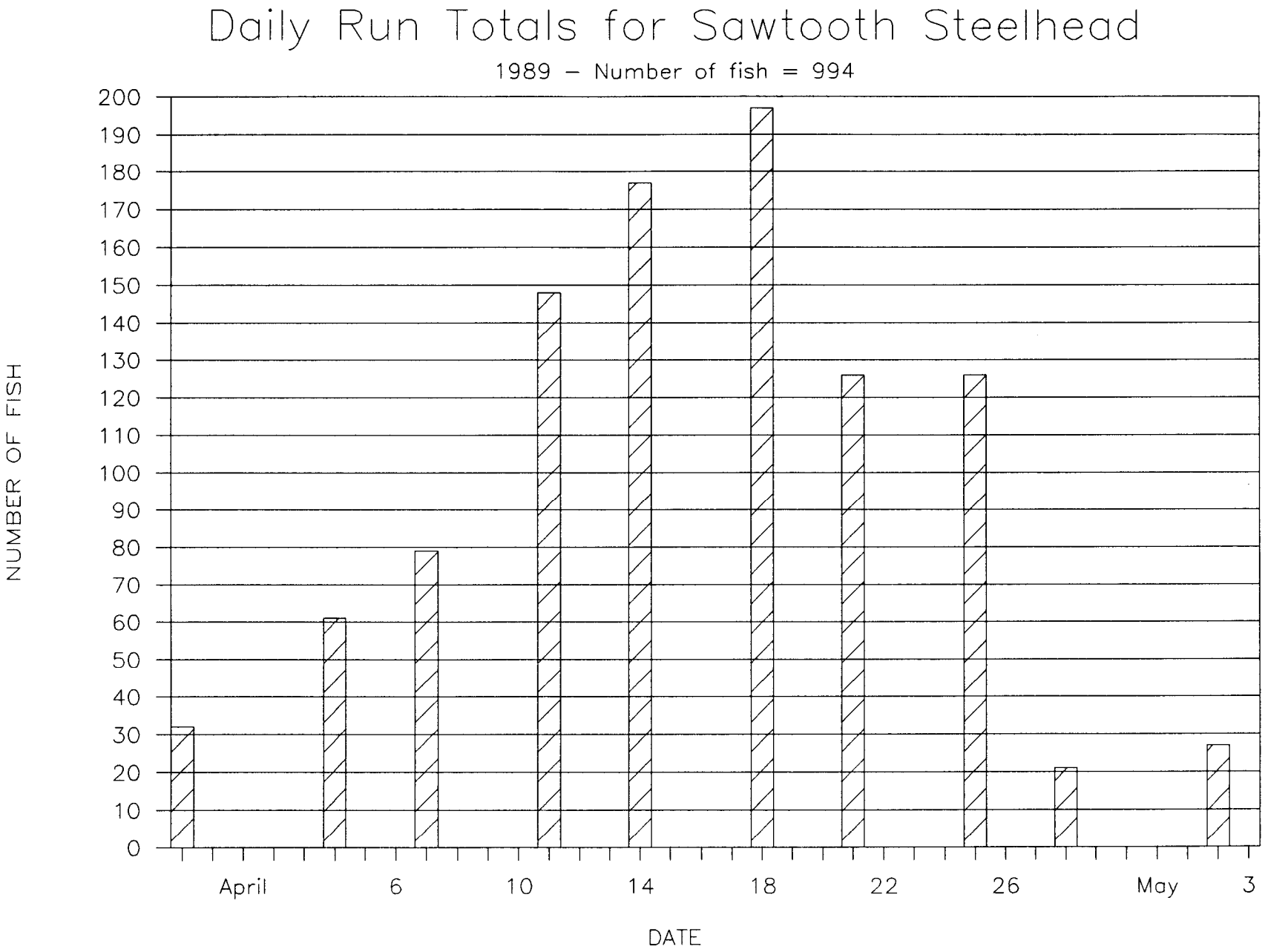


Figure 3. Daily run totals for Sawtooth steelhead, 1989.

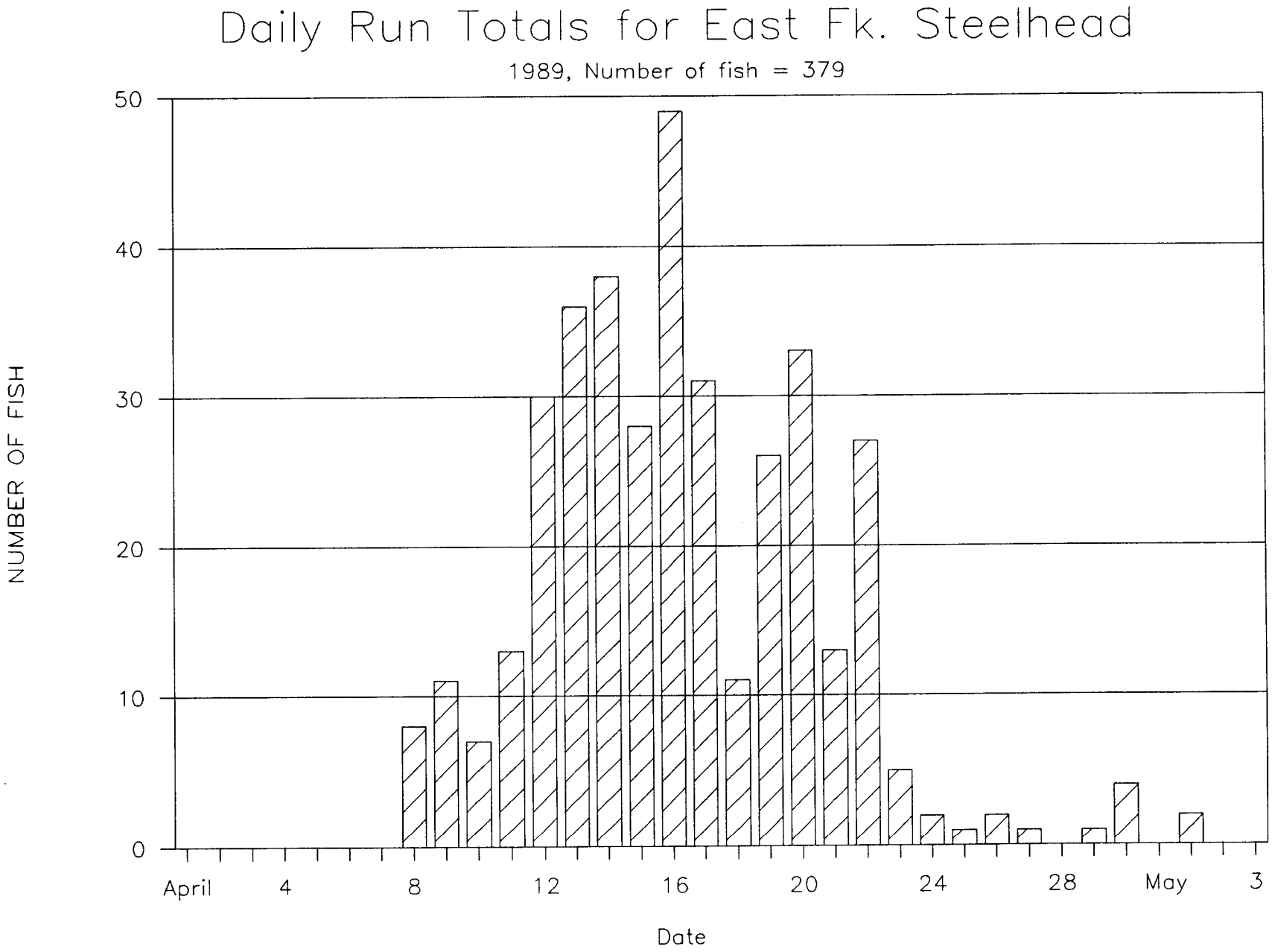


Figure 4. Daily run totals for East Fork steelhead, 1989.

Steelhead Trout Spawning

Sawtooth spawning operations began April 4, 1990 and continued through April 28, 1990. In eight spawning days, 301 females were spawned, taking 1,696,700 green eggs for an average of 5,637 green eggs per female.

East Fork spawning began on April 10, 1990 and continued through April 27. In six spawning days, 79 females yielded 415,000 green eggs for a 5,253 eggs per female average.

Eggs were stripped from the females into colanders with the ovarian fluid drained off. They were then placed into spawning buckets. Eggs were fertilized on a one-to-one ratio then added to another pairs' eggs to form two fish pools. The eggs were allowed to sit, then rinsed with well water and water-hardened in a minimum of 100 ppm Argentyne solution before being incubated. All eyed eggs were shipped to Hagerman National and Magic Valley hatcheries.

Disease Sampling

All Sawtooth Hatchery "A" eggs shipped to Hagerman National require viral disease certification. Each female's ovarian fluid was sampled, along with a sample of kidney and spleen from each male. Disease samples taken were 60 EIBS, 60 BKD, 60 ovarian, and 20 Whirling. Four of the two-fish egg pools tested virus positive and a few whirling spores were found. The same samples were also taken at the East Fork trap. No virus or Whirling Disease was found.

Fish Disposition

At Sawtooth Hatchery, 616 kelts were given to the public and 378 were released to spawn naturally. At the East Fork facility, 155 kelts were given away, and 224 fish were released to spawn naturally (Table 4).

Steelhead Trout Eqqs

After water-hardening, eggs were put away in Heath incubator trays at 70 ounces, or 16,000 eggs per tray. Eggs for fry plants were put away at 35 ounces, or 8,000 eggs per tray. After three days, a 1,667 ppm formalin solution was dripped through the eggs for 15 minutes five times a week for fungal and bacterial control. The eggs eyed-up at 350 TUs. Then they were shocked and machine-picked. After hand-picking, the eggs were ready for shipment.

Sawtooth Hatchery took a total of 1,696,700 green eggs, yielding 1,557,398 eyed eggs, or 93.8% eye-up. East Fork took 415,000 green eggs resulting in

Table 4. Summary of steelhead trout trapped, spawned, and released and kelt disposition at Sawtooth and East Fork facilities, 1989.

Steelhead Trout:	Sawtooth Hatchery	
Fish Trapped:	994	
Males:	536	
Females:	458	
TOTAL:	994	
Fish Disposition:		
Females:	301	Spawned, killed, and/or given to public.
	157	Released upstream to spawn naturally.
	458	Total
Males:	315	Spawned, killed, and/or given to public.
	221	Released upstream to spawn naturally.
	536	Total
Totals:	616	Kelts were given to public.
	378	Released upstream to spawn naturally.
	994	TOTAL
Steelhead Trout:	East Fork	
Fish Trapped:	379	
Males:	250	
Females:	129	
TOTAL:	379	
Fish Disposition:		
Females:	83	Spawned, killed, and/or given to public.
	46	Released upstream to spawn naturally.
	129	Total
Males:	72	Spawned, killed, and/or given to public.
	178	Released upstream to spawn naturally.
	250	Total
Totals:	155	Kelts given to public.
	224	Released upstream to spawn naturally.
	379	TOTAL

333,537 eyed eggs for an 80% eye-up. The hatchery also incubated 3,822,687 green Pahsimeroi eggs. These eyed-up at 78.1%. An additional 542,500 eyed Pahsimeroi eggs were received and incubated at Sawtooth Hatchery. These eggs were for fry plants. The hatchery released 83,874 Sawtooth "A's" as swim-up fry in the upper Salmon drainage, and 1,085,342 Pahsimeroi fry were released along the entire Salmon drainage.

Stocking

Hagerman National and Magic Valley hatcheries stocked 1989 brood year smolts at Sawtooth and East Fork facilities from April 5 through April 11, 1990. Sawtooth received 1,198,700 "A" smolts from Magic Valley and 301,156 "A" smolts from Hagerman. The East Fork received 924,200 "B" smolts from Magic Valley and 64,150 "B" smolts from Hagerman.

8889BYRP

APPENDICES

Appendix A. Sawtooth Hatchery smolt releases and adult returns, 1988.

Brood year	Release year	Number released	Adult returns			Total Returns[1]	Percent
			Jacks	2-Ocean	3-Ocean		
1979	1981	None			291		Inc.[2]
1980	1982	None	17	66	165	248	Inc.[2]
1981	1983	185,375	49	1,182	796	2,027	1.08
1982	1984	230,550	292	922	875	2,086	.91
1983	1985	420,060	51	452	1,318	1,821	.43
1984	1986	347,484	17	86	190	293	.08
1985	1987	1,185,061	80	286	(1990)		Inc.[2]
1986	1987-88	1,705,500	412	(1990)	(1991)		Inc.[2]
1987	1988-89	2,092,000	(1990)	(1991)	(1992)		Inc.[2]
1988	1989-90	1,895,600	(1991)	(1992)	(1993)		Inc.[2]

[1]Includes an unknown number of natural fish.
[2]lncomplete or no smolts released.

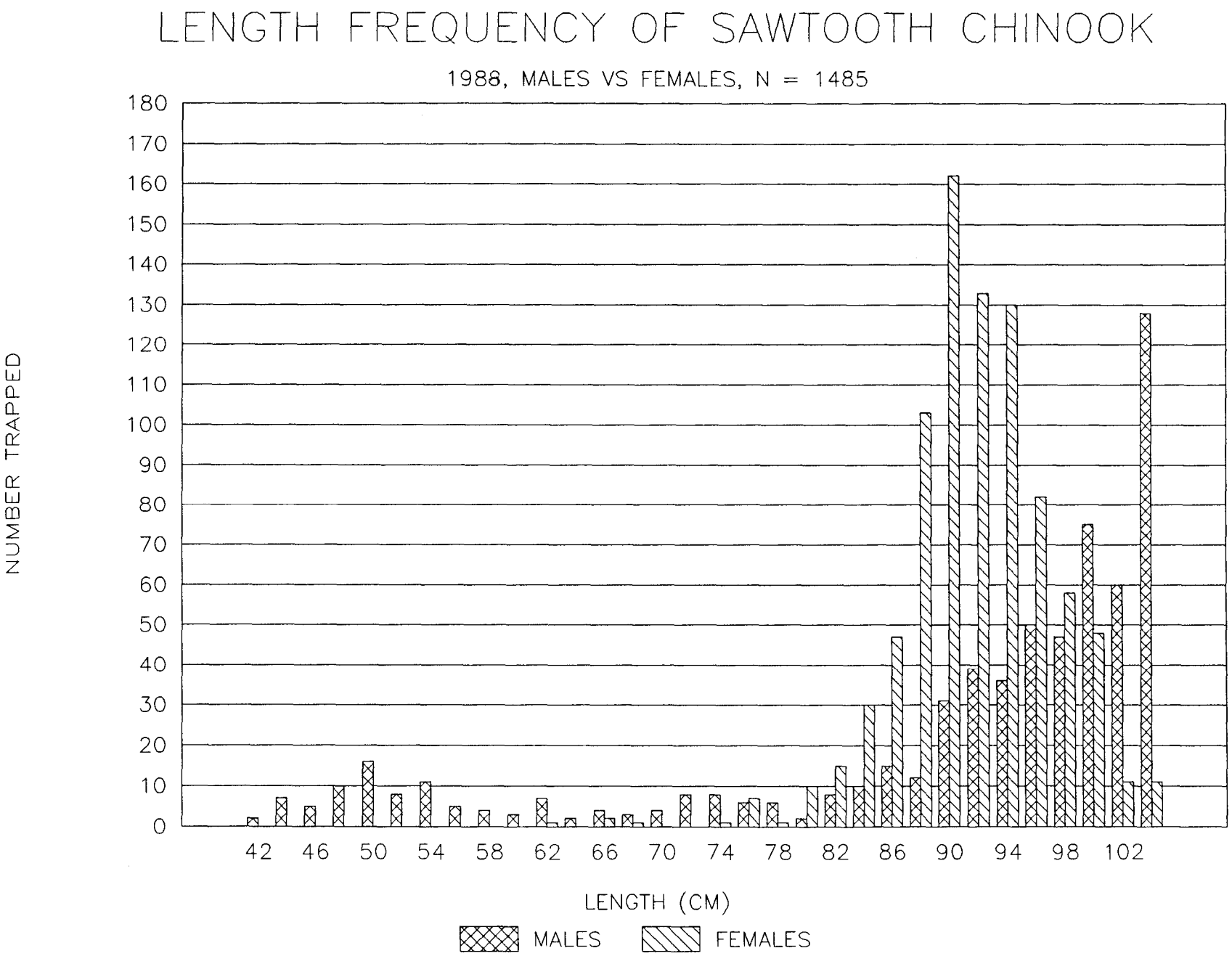
Appendix B. East Fork chinook salmon smolt releases and adult returns, 1988.

Brood year	Release year	Number released	Adult returns			Total Returns[1]	Percent
			Jacks	2-Ocean	3-Ocean		
1979	1981	*			69	69	Inc.[2]
1980	1982	*		26	59	85	Inc.[2]
1981	1983	*	22	193	102	317	Inc.[2]
1982	1984	*	51	87	181	319	Inc.[2]
1983	1985	*	5	90	519	614	Inc.[2]
1984	1986	108,690	1	23	51	75	.07
1985	1987	195,100	6	55	(1990)		Inc.[2]
1986	1988	249,200	22	(1990)	(1991)		Inc.[2]
1987	1989	305,300	(1990)	(1991)	(1992)		Inc.[2]
1988	1990	514,600	(1991)	(1992)	(1993)		Inc.[2]

'Includes remnant population of wild fish.
[2]lncomplete or no smolt released.

Appendix C. Length frequency distribution of Sawtooth chinook salmon, 1988.

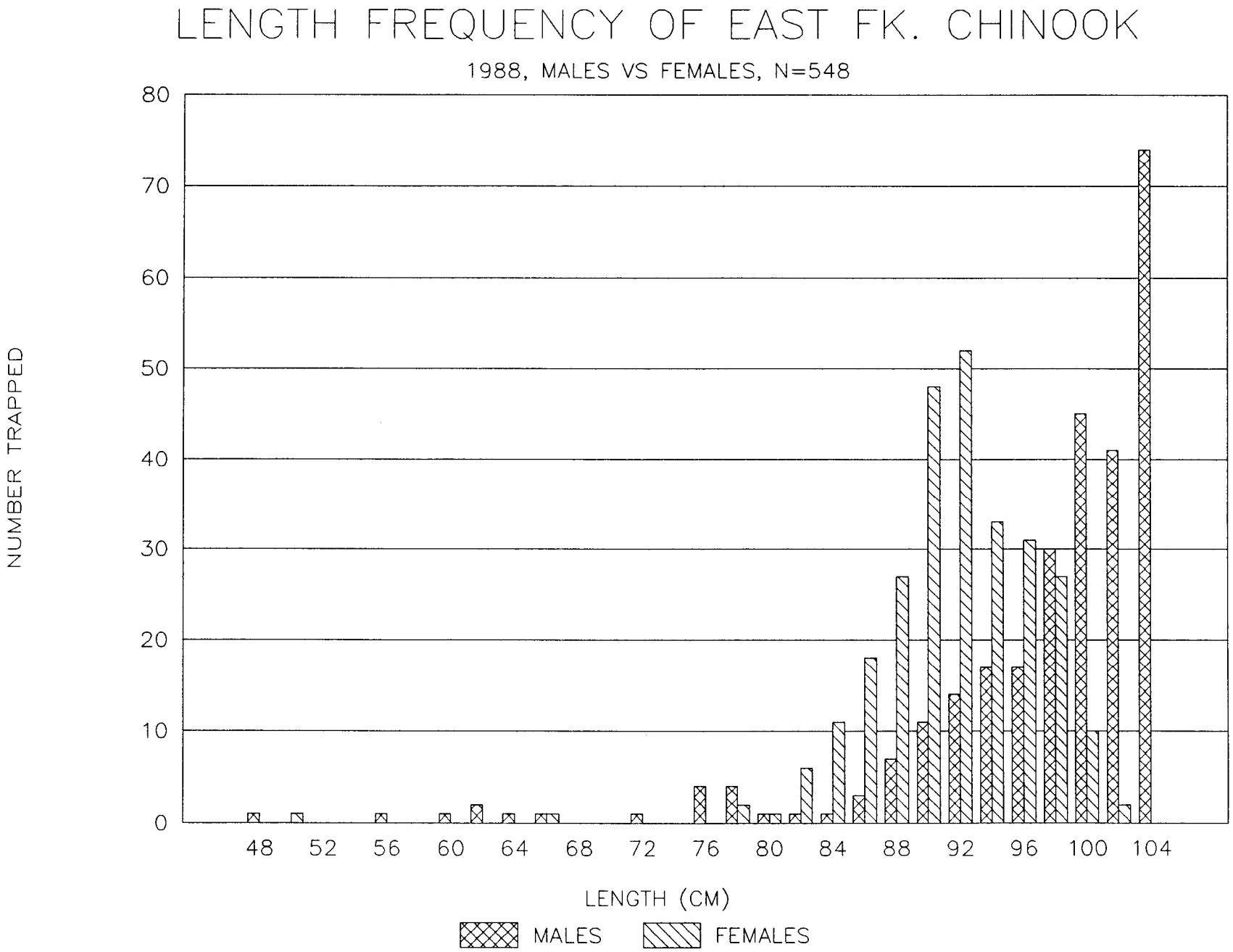
	Fish trapped	Males	Females	Length (in)	Length (cm)
	2	2	0	16.54	42
	7	7	0	17.32	44
	5	5	0	18.11	46
	10	10	0	18.90	48
	16	16	0	19.69	50
	8	8	0	21.67	52
	11	11	0	21.26	54
	5	5	0	22.05	56
	4	4	0	22.83	58
	3	3	0	23.62	60
	8	7	1	24.41	62
	2	2	0	25.20	64
	6	4	2	25.98	66
	4	3	1	26.77	68
	4	4	0	27.56	70
	8	8	0	28.35	72
	9	8	1	29.13	74
	13	6	7	29.92	76
	7	6	1	30.71	78
	12	2	10	31.50	80
	23	8	15	32.28	82
	40	10	30	33.07	84
	62	15	47	33.85	86
	115	12	103	34.65	88
	193	31	162	35.43	90
	172	39	133	36.22	92
	166	36	130	37.01	94
	132	50	82	37.80	96
	105	47	58	38.58	98
	123	75	48	39.37	100
	71	60	11	40.16	102
	139	128	11	40.95	104
Totals	1,485	632	853		



Appendix D. Length frequency of Sawtooth chinook, 1988.

Appendix E. Length frequency distribution of East Fork chinook salmon, 1988.

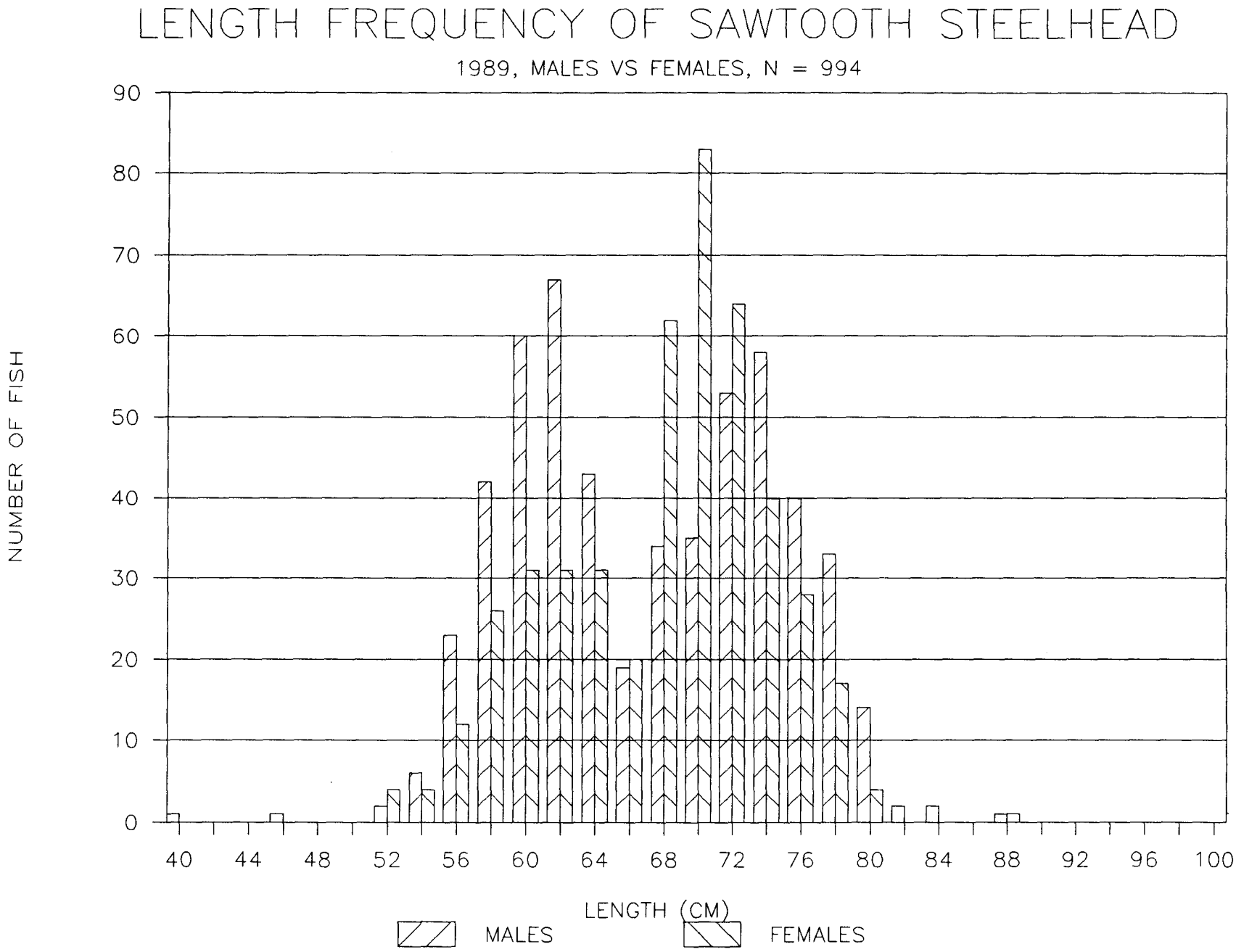
	Fish trapped	Males	Females	Length (in)	Length (cm)
	1	1	0	18.90	48
	1	0	0	19.69	50
	0	0	0	21.67	52
	0	0	0	21.26	54
	1	1	0	22.05	56
	0	0	0	22.83	58
	1	1	0	23.62	60
	2	2	0	24.41	62
	1	1	0	25.20	64
	2	1	1	25.98	66
	0	0	0	26.77	68
	0	0	0	27.56	70
	1	1	0	28.35	72
	0	0	0	29.13	74
	4	4	0	29.92	76
	6	4	2	30.71	78
	2	1	1	31.50	80
	7	1	6	32.28	82
	12	1	11	33.07	84
	21	3	18	33.85	86
	34	7	27	34.65	88
	59	11	48	35.43	90
	66	14	52	36.22	92
	50	17	33	37.01	94
	48	17	31	37.80	96
	57	30	27	38.58	98
	55	45	10	39.37	100
	43	41	2	40.16	102
	74	74	0	40.95	104
Totals	548	278	270		



Appendix F. Length frequency of East Fork chinook, 1988.

Appendix G. Length frequency distribution of Sawtooth steelhead trout, 1989.

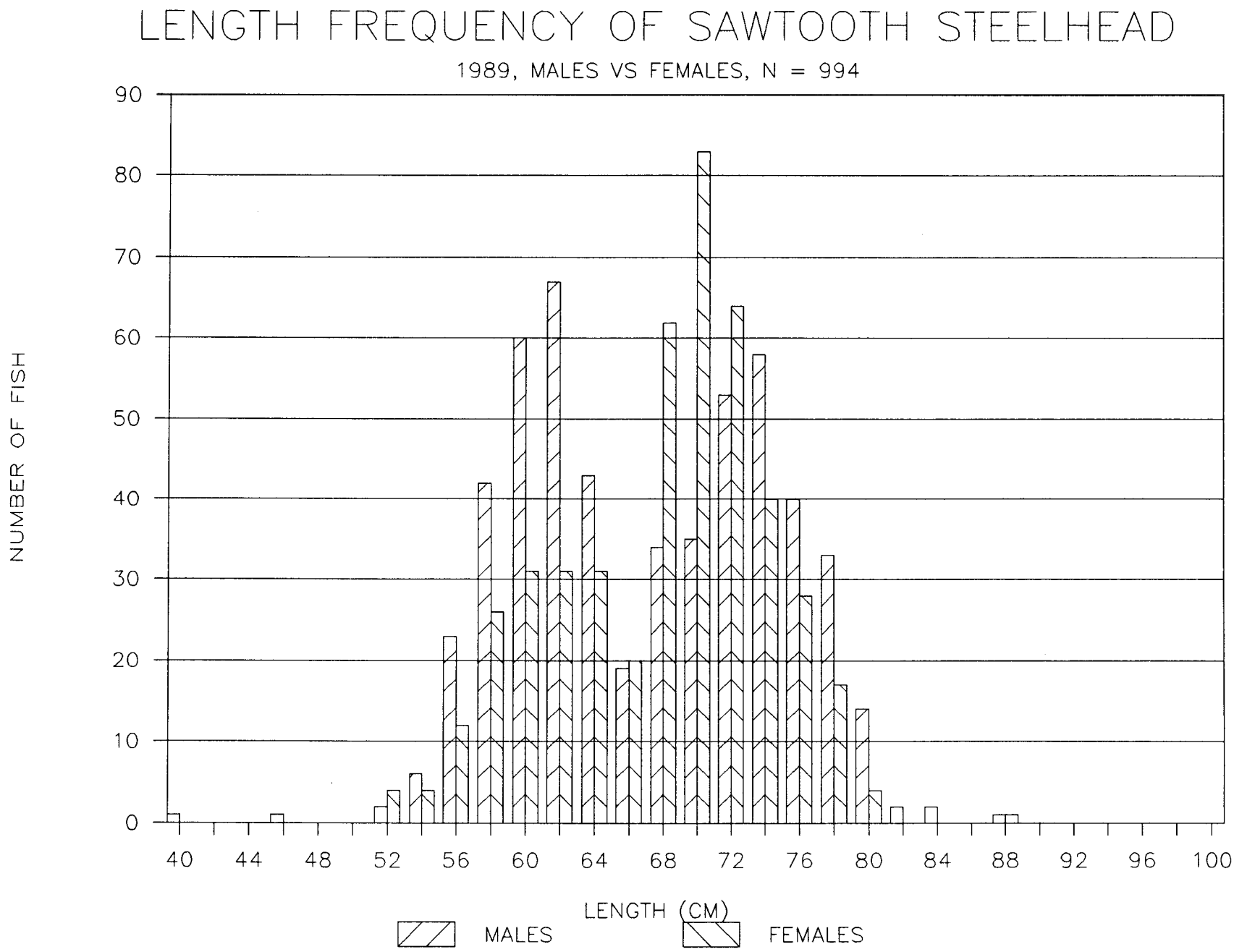
	Length (cm)	Hatchery males	Wild male	Hatchery females	Wild females	Total
	38	0	0	0	0	0
	40	0	0	0	0	0
	42	1	0	0	0	1
	44	0	0	0	0	0
	46	0	1	0	0	1
	48	0	0	0	0	0
	50	0	0	0	0	0
	52	0	2	3	1	6
	54	6	0	4	0	10
	56	23	0	12	0	35
	58	38	4	23	3	68
	60	57	3	29	2	91
	62	64	3	29	2	98
	64	38	5	29	2	74
	66	17	2	14	6	39
	68	33	1	57	5	96
	70	35	0	78	5	118
	72	51	2	60	4	117
	74	57	1	35	5	98
	76	38	2	22	6	68
	78	31	2	14	3	50
	80	14	0	1	3	18
	82	2	0	0	0	2
	84	2	0	0	0	2
	86	0	0	0	0	0
	88	1	0	1	0	2
	90	0	0	0	0	0
	92	0	0	0	0	0
	94	0	0	0	0	0
	96	0	0	0	0	0
	98	0	0	0	0	0
	100	0	0	0	0	0
Totals		508	28	41	47	994



Appendix H. Length frequency of Sawtooth steelhead, 1989.

Appendix I. Length frequency distribution of East Fork steelhead trout, 1989.

Length (cm)	Hatchery males	Wild males	Hatchery females	Wild females	Total
50	0	0	0	0	0
52	0	0	0	0	0
54	0	0	0	0	0
56	0	0	0	0	0
58	0	0	0	0	0
60	2	1	2	0	5
62	9	1	0	0	10
64	8	0	1	1	10
66	5	1	3	0	9
68	1	0	0	0	1
70	5	1	5	1	12
72	2	0	7	0	9
74	10	2	18	0	30
76	24	1	23	2	50
78	27	2	18	0	47
80	66	0	20	0	86
82	34	0	16	1	51
84	41	0	6	0	47
86	5	0	1	1	7
88	2	0	1	2	5
90	0	0	0	0	0
Totals	241	9	121	8	379



Appendix H. Length frequency of Sawtooth steelhead, 1989.

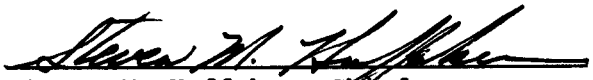
Fall release October 1989	Mark	# fish	Taa code	Purpose
Sawtooth stock	CWT/AD	45,275	10-32-22	US-Can/fall vs spring release
	CWT/AD	46,525	10-32-23	Same
Total		91,800		
Spring release March 1990				
East Fork stock March 1990	CWT/AD	47,225	10-32-11	US-Can/RW Rear Density study
	CWT/AD	47,425	10-32-12	Same
Total		94,650		
Sawtooth stock	CWT/AD	47,500	10-32-20	Same
	CWT/AD	51,125	10-40-08	US-Can/Mark Timing study
	CWT/AD	50,300	10-32-21	Same
	CWT/AD	51,700	10-32-24	Same
Total		200,625		
	PIT	10,002	# N/A	Migrating/Migra Monitoring
Total		10,002		
	FB	19,875	LA-T-1	Passage/Migra Monitoring
	FB	18,650	LA-T-3	Same
	FB	18,775	LA-T-4	Same
Total		57,300		

Submitted by:

Richard D. Alsager
Hatchery Superintendent III

Approved by:

IDAHO DEPARTMENT OF FISH AND GAME Fish



Steven M. Huffaker, Chief
Bureau of Fisheries

Bill Hutchinson
Fish Hatcheries Manager